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0007118849 20010101.

Title

An integrated **optical** Mach-Zehnder interferometer functionalized by beta-Mach-Zehnder-cyclodextrin to monitor binding reactions.

Source

Sensors and Actuators B (Chemical), {Sens-Actuators-B-Chem-Switzerland }, 20 Nov. 2001, vol. B80, no. 2, p. 116-24, 40 refs, CODEN: SABCEB, ISSN: 0925-4005.

Publisher: Elsevier, Switzerland.

Author(s)

Busse-S, DePaoli-M, Wenz-G, Mittler-S.

Author affiliation

Busse, S., Max-Planck-Inst. fur Polymerforschung, Mainz, Germany.

Abstract

We demonstrate an integrated **optical** Mach-Zehnder interferometer for the monitoring of guest-host reactions on immobilized beta-cyclodextrin (beta-CD). **Adamantane carboxylic acid**, 4-tert-butylbenzoic acid and methyl orange were investigated as guest molecules. The binding constants of the three guests into the two-dimensionally arranged immobilized cyclodextrins could be determined and are a quarter to a third smaller than the values measured in the three-dimensional environment of a solution.

Descriptors

BIOSENSORS; CHEMICAL-REACTIONS; CHEMICAL-VARIABLES-MEASUREMENT; INTEGRATED-OPTICS; MACH-ZEHNDER-INTERFEROMETERS; MOLECULAR-BIOPHYSICS;

ORGANIC-COMPOUNDS; SPECTROCHEMICAL-ANALYSIS.

Classification codes

A8780B Biosensors*;
A0760L Optical-interferometry;
A4282 Integrated-optics;
A8230 Specific-chemical-reactions-reaction-mechanisms;
A8280D Electromagnetic-radiation-spectrometry-chemical-analysis;
A8715 Molecular-biophysics;
B7230J Biosensors*;
B4140 Integrated-optics;
B7320T Chemical-variables-measurement.

Keywords

integrated-optical-Mach-Zehnder-interferometer; binding-reactions-monitoring; guest-host-reactions; 2D-environment; immobilized-beta-cyclodextrin; **Adamantanecarboxylic-acid**; 4-tert-butylbenzoic-acid; methyl-orange; guest-molecules.

Treatment codes

P Practical;
X Experimental.

Language

English.

Publication type

Journal-paper.

Availability

SICI: 0925-4005(20011120)B80:2L.116:IOMZ; 1-U.

CCCC: 0925-4005/01/\$20.00.

Publisher identity number: S0925-4005(01)00889-9.

Publication year

2001.

Publication date

20011120.

Edition

2001049.

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Accession number & update

0006766816 20051201.

Title

CHEMILUMINESCENCE of praseodymium (III), neodymium (III) and ytterbium (III) beta-diketonates in solution excited from 1,2-dioxetane decomposition and singlet-singlet energy transfer from ketone to rare-earth beta-diketonates.

Source

Journal of **Luminescence**, {J-Lumin-Netherlands}, Sept. 2000, vol. 91, no. 1-2, p. 49-58, 45 refs,
CODEN: JLUMA8, ISSN: 0022-2313.

Publisher: Elsevier, Netherlands.

Author(s)

Voloshin-A-I, Shavaleev-N-M, Kazakov-V-P.

Author affiliation

Voloshin, A.I., Shavaleev, N.M., Kazakov, V.P., Inst. of Org. Chem., Ufa Sci. Center of the Russian Acad. of Sci., Oktyabrya, Russia.

Abstract

This work is concerned with the **chemiluminescence** (CL) of Nd³⁺, Yb³⁺ and Pr³⁺/beta-diketonates in solution. **Che miluminescent reaction of adamantylideneadamantane-1,2-dioxetane** (AAD) decomposition generating singlet (Ad=O₂S*) and triplet (Ad=O₂T*) excited **adamantanone** was used as a source of excited species. AAD **chemiluminescence** due to emission from Ad=O₂S* is quenched by Ln³⁺ beta-diketonates: (a) by intermolecular singlet-singlet (S-S) energy transfer from Ad=O₂S* to beta-diketonate ligand levels of Ln (TTA)₂H₂formation between AAD and Pr(FOD)₃ or Pr(DPM)₃. Corresponding Stern-Volmer quenching constants or stability constants of the complex were measured. **Che miluminescence** spectra of Ln³⁺ beta-diketonates were recorded and relative **luminescence** quantum yields compared. Yb³⁺ chelates show higher **luminescence** yields compared to Nd³⁺, due to a different efficiency of non-radiative energy degradation. Chemiexcitation of Ln³⁺ ions in the systems studied occurs by: (a) intermolecular singlet-singlet energy transfer: Ad=O₂S*rightward arrowL₂S*rightward arrowL₂T*rightward arrowLn³⁺and triplet excited states of the beta-diketonate ligand); (b) intermolecular triplet-triplet energy transfer: Ad=O₂T*rightward arrowLfrom the decomposition of AAD in the complex with Ln³⁺ beta-diketonate. Efficiency of chemiexcitation pathways is different for each Ln³⁺ beta-diketonate and Ln³⁺ ion.

Descriptors

CHEMILUMINESCENCE; NEODYMIUM-COMPOUNDS; ORGANIC-COMPOUNDS;
 PRASEODYMIUM-COMPOUNDS; YTTERBIUM-COMPOUNDS.

Classification codes

A7860P Chemiluminescence-condensed-matter*;
A8240T Chemiluminescence-and-chemical-laser-kinetics.

Keywords

chemiluminescence; beta-diketonates; decomposition; intermolecular- energy-transfer; lanthanide-ions; rare-earths; praseodymium; neodymium; ytterbium; singlet-singlet-energy-transfer; triplet-triplet-energy-transfer; intracomplex-energy-transfer; **luminescence**- quantum-yield; chemiexcitation; complex-formation; ketones.

Treatment codes

Experimental.

Language

English.

Publication type

Journal-paper.

Availability

SICI: 0022-2313(200009)91:1/2L.49:CPNY; 1-X.

CCCC: 0022-2313/2000/\$20.00.

Publisher identity number: S0022-2313(00)00199-X.

Publication year

2000.

Publication date

20000900.

Edition

2000046.

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Accession number & update

0005837695 20051201.

TitleGrowth method, **optical** properties, and application of organic nonlinear **optical** crystal **2-adamantylamino-5-nitropyridine**.**Conference information**Nonlinear **Optical** Properties of Organic Materials X, San Diego, CA, USA, 30 July-1 Aug. 1997.

Sponsor(s): SPIE.

SourceProceedings of the SPIE - The International Society for **Optical** Engineering, {Proc-SPIE-Int-Soc-Opt-Eng-USA}, 1997, vol. 3147, p. 20-9, 20 refs, CODEN: PSISDG, ISSN: 0277-786X.
Publisher: SPIE-Int. Soc. Opt. Eng, USA.**Author(s)**Yokoo-A, Yokohama-I, Takara-H, Kaino-T.**Author affiliation**

Yokoo, A., Yokohama, I., Takara, H., NTT Opto-Electron. Labs., Kanagawa, Japan.

Abstract

Organic second-order nonlinear **optical** crystals are expected to be more useful than inorganic crystals such as LiNbO₃ or KTiOPO₄(chi /sup (2)/). A long interaction length in the phase-matched direction is required to obtain devices with high wavelength conversion efficiency. We have devised an indirect laser-heated pedestal growth (ILHPG) method in which the growth direction of organic crystal can be controlled. We have successfully applied the method to grow organic nonlinear **optical** crystal **2-adamantylamino-5-nitropyridine** (AANP). The grown AANP has been characterized in terms of its linear and nonlinear **optical** properties. The results show that type II angle-tuned phase-matched wavelength conversions, such as second harmonic generation (SHG) and **optical** parametric generation (OPG), are possible in the wavelength region from 1.2 to 17 μm. This means, it is possible for AANP to provide type II angle-tuned phase-matched wavelength conversion with high efficiency for **optical** communications systems. As an example, the AANP was applied for **optical** sampling measurements. In addition, reducing absorption in the AANP crystal by using a deuterated derivative of AANP increases the SHG efficiency at 1.55 μm.

Descriptors

CRYSTAL-GROWTH-FROM-MELT; NONLINEAR-OPTICAL-SUSCEPTIBILITY; OPTICAL-COMMUNICATION-EQUIPMENT; OPTICAL-FABRICATION; OPTICAL-HARMONIC-GENERATION; OPTICAL-MATERIALS; OPTICAL-PARAMETRIC-DEVICES; WAVELENGTH-DIVISION-MULTIPLEXING.

Classification codes

A4265K Optical-harmonic-generation-frequency-conversion-parametric-oscillation-and-amplification*;
A4270F Other-optical-materials;
A8110F Crystal-growth-from-melt;
A4285D Optical-fabrication-surface-grinding;
B4340 Nonlinear-optics-and-devices*;
B4110 Optical-materials;
B0510 Crystal-growth.

Keywords

growth-method; **optical-properties**; **organic-nonlinear-optical-crystal**; **organic-second-order-nonlinear-optical-crystals**; nonlinear-susceptibility; long-interaction-length; phase-matched-direction; wavelength-conversion-efficiency; indirect-laser-heated-pedestal-growth; **nonlinear-optical-properties**; **linear-optical-properties**; type-II-angle-tuned-phase-matched-wavelength-conversion; second-harmonic-generation; **optical-parametric-generation**; **optical-communications-systems**; **optical-sampling-measurements**; deuterated-derivative; SHG-efficiency; 1.2-to-1.7-μm; 1.55-μm.

Treatment codes Experimental.**Numerical indexing**

wavelength: 1.2E-06 to 1.7E-06 m.

wavelength: 1.55E-06 m.

Language

English.

Publication type

Conference-proceedings; Journal-paper.

Availability

SICI: 0277-786X(1997)3147L.20:GMOP; 1-R.
CCCC: 0277-786X/97/\$10.00.

Publication year

1997.

Publication date

19970000.

Edition

1998008.

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0005796614 20051201.

Title

Branched quantum-chain processes in the decay of 1,2-dioxetane with participation of Eu(fod)/sub 3/ at the surface of a sorbent and in solution.

Source

Optics and Spectroscopy, {Opt-Spectrosc-Russia}, Nov. 1997, vol. 83, no. 5, p. 797-801, CODEN: OPSUA3, ISSN: 0030-400X.

Publisher: MAIK Nauka/Interperiodica Publishing, Russia.

Translation from: Optika i Spektroskopiya, {Opt-Spektrosk-Russia}, Nov. 1997, vol. 83, no. 5, p. 860-4, CODEN: OSFMA3, ISSN: 0030-4034.

Country of publication: Russia.

Author(s)

Kazakov-V-P, Voloshin-A-I, Ostakhov-S-S.

Author affiliation

Kazakov, V.P., Voloshin, A.I., Ostakhov, S.S., Inst. of Org. Chem., Acad. of Sci., Ufa.

Abstract

Anomalous behavior of **chemiluminescence** (CL) of **adamantylidenadamantane-1,2-dioxetane** (Di) activated by chelate Eu (fod)branched quantum-chain processes of decomposition of dioxetane. The growth of the CL intensity with an increase in the Eu(III) concentration is well described by an exponential. On the basis of data on the kinetics of photophysical processes and the analysis of variations of spectral bands of Eu(III) **fluorescence** /sup 5/D/sub 1 /rightward arrowthe dioxetane concentration, a conclusion is made that quenching of the complex with excitation in the /sup 5/D/sub 0/ state conserved leads to the decay of a hyperenergetic molecule of dioxetane in complex with Eu (III) and its excitation to the /sup 5/D/sub 1/ and.

Descriptors

[CHEMILUMINESCENCE](#); [FLUORESCENCE](#); [ORGANIC-COMPOUNDS](#); [RADIATION-QUENCHING](#); [REACTION-KINETICS](#); [SORPTION](#).

Classification codes

A8240T [Chemiluminescence-and-chemical-laser-kinetics*](#);

A7860P [Chemiluminescence-condensed-matter](#);

A3350D [Molecular-fluorescence-and-phosphorescence-spectra](#);

A7855K [Photoluminescence-in-organic-materials](#);

A8265M [Sorption-and-accommodation-coefficients-surface-chemistry](#);

A8220 [Chemical-kinetics](#).

Keywords

branched-quantum-chain-processes; 12-dioxetane; Eu(fod)/sub-3/; sorbent; anomalous-behavior; **chemiluminescence**; **adamantylidenadamantane-12-dioxetane**; chelate-Eu(fod)/sub-3/;

sorbent- surface; Eu(III)-concentration; kinetics; photophysical-processes; spectral-bands; **Eu(III)-fluorescence**; /sup-5/D/sub-1/rightward-arrow /sup-7/F/sub-j/; /sup-5/D/sub-0/rightward-arrow/sup-7/F/sub-j/; dioxetane-concentration; /sup-5/D/sub-1/-state-quenching; hyperenergetic-molecule.

Treatment codes

T Theoretical-or-mathematical;
X Experimental.

Language

English.

Publication type

Journal-paper.

Availability

SICI: 0030-400X(199711)83:5L.797:BQCP; 1-9.

CCCC: 0030-400X/96/835-0797\$10.00.

SICI of original-language version: 0030-4034(199711)83:5L.860; 1-7.

Publication year

1997.

Publication date

19971100.

Edition

1998002.

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Accession number & update

0001923863 20051201.

Title

Optical activity due to deuterium substitution in adamantanone and adamantanethione. Barrier to inversion in the /sup 1/npi* excited state.

Source

Chemical Physics, {Chem-Phys-Netherlands}, 15 July 1982, vol. 69, no. 1-2, p. 19-26, 25 refs, CODEN: CMPHC2, ISSN: 0301-0104, Netherlands.

Author(s)

Schippers-P-H, Dekkers-H-P-J-M.

Author affiliation

Schippers, P.H., Dekkers, H.P.J.M., Dept. of Theoretical Organic Chem., Univ. of Leiden, Leiden, Netherlands.

Abstract

The circular dichroism (CD) and absorption were measured in the (1S)-4,4-dideutero-adamantan-2-one (1) and (1S)-4,4-dideutero- adamantane-2-thione (2). In addition the circular polarization in the fluorescence of 1 is reported. Since 1 and 2 owe their optical activity to a small perturbation of the C/sub 2v/ symmetry due to deuterium substitution, it is argued that the CD originates from transitions to totally symmetric upper state vibrational levels, whereas the absorption is induced by non-totally symmetric vibrations. The vibrational structure in the spectra is analysed in terms of the (thio) carbonyl stretching and out-of-plane bending modes. By comparison of the frequencies of the vibrations, active in CD and absorption, it is found that in the /sup 1/npi* state 1 has a double minimum potential in the out-of-plane bending mode, with an inversion barrier of ca. 1100 cm⁻¹. The data for 2 are consistent with a much lower barrier to inversion.

Descriptors

MOLECULAR-ELECTRONIC-STATES; MOLECULAR-VIBRATION; OPTICAL-ROTATION;
 ORGANIC-COMPOUNDS; ROTATIONAL-ISOMERISM.

Classification codes

A3150 Excited-states-of-atoms-and-molecules*;
A3345 Magneto-optical-and-electro-optical-effects-in-molecules- birefringence-dichroism-and-optical-activity;
A3350D Molecular-fluorescence-and-phosphorescence-spectra;
A4210N Optical-polarization-in-homogeneous-media.

Keywords

optical-activity; D-substitution; isotope-effect; light-absorption; **fluorescence-polarisation;**
adamantanone; **adamantanethione;** circular- dichroism; **(1S)-44-dideuterio-adamantan-2-one;**
(1S)-44-dideuterio- **adamantane-2-thione;** circular-polarization; totally-symmetric-upper- state-
vibrational-levels; non-totally-symmetric-vibrations; vibrational-structure; carbonyl-stretching; out-of-
plane-bending-modes; double-minimum-potential; out-of-plane-bending-mode; inversion-barrier.

Treatment codes

X Experimental.

Language

English.

Publication type

Journal-paper.

Publication year

1982.

Publication date

19820715.

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1982010.

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Accession number & update

0000666475 20051201.

Title

Free radicals in an **adamantane** matrix. IX. **Optical** excitation and emission spectra of the benzyl radical and its monofluorinated derivatives.

Source

Journal of Chemical Physics, {J-Chem-Phys-USA}, 1 April 1974, vol. 60, no. 7, p. 2684-91, 29 refs,
CODEN: JCPSA6, ISSN: 0021-9606, USA.

Author(s)

Lloyd-R-V, Wood-D-E.

Author affiliation

Lloyd, R.V., Wood, D.E., Univ. Connecticut, Storrs, CT, USA.

Abstract

For pt. XIII, see J. Am. Chem. Soc., vol.96, 659 (1974). Electroic emission- and excitation-spectra of the benzyl radical in an **adamantane** matrix resemble those found in other condensed phases, and are more readily obtained because of the ease with which operations using **adamantane** can be carried out. Corresponding spectra are obtained for the alpha-fluorobenzyl radical, and of the o-, m-, and p-fluorobenzyls, some of these for the first time. Values for all substituted radicals (except the 3100 Å for p-fluorobenzyl) are shifted towards the red compared with the unsubstituted radical. Vibrational fine-

structure has been analysed for two bands of each radical.

Descriptors

FREE-RADICALS; MOLECULAR-VIBRATION; ORGANIC-COMPOUNDS; SPECTRA-OF-ORGANIC-MOLECULES-AND-SUBSTANCES.

Classification codes

A3320K Visible-molecular-spectra*;
A3520S Molecular-hyperfine-and-fine-structure-constants;
A7840 Visible-and-ultraviolet-spectra-condensed-matter.

Keywords

free-radicals; **adamantane-matrix**; emission-spectra; benzyl-radical; monofluorinated-derivatives; optical-excitation-spectra; spectral-shift; vibrational-fine-structure.

Treatment codes

X Experimental.

Language

English.

Publication type

Journal-paper.

Publication year

1974.

Publication date

19740401.

Edition

1974007.

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